31 August 1999

PURCHASE DESCRIPTION

ANALYZER, RF SPECTRUM

SCAT 4341-I.rev1

1.0 GENERAL This procurement requires a portable spectrum analyzer with internal tracking generator which operates over the frequency range of 100 Hz to 3 GHz.

2.0 CLASSIFICATION The equipment shall meet the requirements of MIL-PRF-28800F class 3 for Navy shipboard, submarine and shore applications, with the following exceptions:

a. The warmup time is extended to one hour.
b. A tilt-bail handle shall be provided.

3.0 MEASUREMENT REQUIREMENTS The equipment shall be capable of spectrum analysis within the following minimum specifications.

3.1 Frequency Measure

3.1.1 Range: 100 Hz to 3 GHz

3.1.2 Accuracy
±[5% of span + 15% of resolution bandwidth + 50 Hz + (center frequency X 10^{-7})]

3.1.3 Resolution: 1% or less of the selected span. This resolution may be provided by the signal counter.

3.1.4 Stability: After a 1 hour warmup, the frequency drift shall not exceed 50 Hz per minute for spans of 100 kHz or less.

3.1.5 Sweep
3.1.5.1 Time: At least100 µsec to100 sec in zero span mode
3.1.5.1.1 Accuracy: ±1% of setting
3.1.5.2 Trigger: Internal (free run), external, single, video

3.1.6 Span
3.1.6.1 Widths: 100 Hz to 3 GHz
3.1.6.2 Accuracy: ± 5%

3.2 Amplitude Measure

3.2.1 Range: +30 dBm to displayed average noise level
3.2.1.1 1 dB Gain compression: Mixer level ≥ -5 dBm
3.2.1.2 Dynamic Range: At least 80 dB at 10 dB/div

3.2.2 Accuracy: ±2 dB log mode

3.2.3 Flatness: ±1.5 dB maximum

3.2.4 Distortion
3.2.4.1 Spurious responses with no signal input
3.2.4.1.1 100 Hz to 500 Hz: ≤-65 dBm
3.2.4.1.2 500 Hz to 200 kHz: ≤-85 dBm
3.2.4.1.3 200 kHz to 3 GHz: ≤-90 dBm
3.2.4.2 Harmonic distortion: ≤ -60 dBc (at 100 Hz to 900 MHz input frequencies, for an input mixer signal level of -40 dBm)
3.2.4.3 Third-order intermodulation products. Input mixer signal level of -30 dBm:
3.2.4.3.1 100 Hz to 10 MHz: ≤ -64 dBc
3.2.4.3.2 10 MHz to 3 GHz: ≤-70 dBc
3.2.4.4 Noise sidebands. The noise sidebands shall be ≤ -100 dBc/Hz (at offsets from carrier of 30 x resolution bandwidth with resolution bandwidths of 1 kHz or greater.)

3.2.5 Reference Level: At least +30 dBm to -80 dBm

3.2.6 Attenuator: At least 0 to + 60 dB
3.2.6.1 Accuracy: ±2.0 dB

3.3 Marker/s

3.3.1 Modes: 1 or 2 independent markers
3.3.1.1 Single: One marker displays ABSOLUTE Frequency & Amplitude
3.3.1.2 Delta: . Two markers display Frequency and Amplitude DIFFERENCE

3.3.2 Resolution
3.3.2.1 Frequency: Same as 3.1.3 or better
3.3.2.2 Amplitude: 0.1 dB or better

3.4 Signal Counter Capable of counting signals within the specified frequency range

3.4.1 Accuracy: ±[(marker frequency x frequency reference accuracy) + 1LSD]

3.4.2 Resolution: Selectable from at least 1 Hz to 1 kHz

3.5 Resolution Bandwidth: Selectable from at least10 Hz to 1 MHz in 1, 3 sequence.

3.5.1 Accuracy: ±20% of the selected bandwidth; ±25% at 1 MHz; ±30% at 10 Hz

3.6 Video Bandwidth Selectable from at least 1 Hz to 100 kHz

3.7 Miscellaneous

3.7.1 Input impedance: 50 ohms nominal. 1.5:1 maximum VSWR with 10 dB or more input attenuation selected

3.7.2 Vertical display modes. Log 10 dB/div, log 2 dB/div, and linear V

3.7.3 Digital storage. Digital storage shall be provided with selectable modes that compare and subtract two signals, and save maximum signal values and noise-average spectral displays. The digital storage function shall be capable of storing and displaying at least five spectrums including the readout measurement parameters. When batteries are required for digital storage circuitry, they shall have a useful life of at least 12 months under normal operating conditions within the operating temperature range.

3.7.4 Display specifications. A display with an internal graticule of 10 x 10 divisions shall be provided. The display shall provide a readout of center frequency, span, resolution bandwidth, vertical scale factor, reference level, marker readout of frequency and amplitude, video filter selection, and RF attenuation. The display area shall be at least 7 cm high by 8 cm wide.

3.8 Inputs/Outputs

3.8.1 RF Input. Type N (female)
3.8.1.1 Impedance: 50 ohms
3.8.1.2 VSWR: 1.5:1

3.8.2 Tracking generator. The equipment shall be include a tracking generator that meets the following specifications:
3.8.2.1 Frequency range: at least 9 kHz to 3 GHz
3.8.2.2 Output level: ≥-3dBm
3.8.2.3 Attenuation range: 0 dB to ≥50 dB in 5 or more steps
3.8.2.4 Flatness: ±3 dB
3.8.2.5 Residual FM: ± 50 Hz peak-to-peak
3.8.2.6 Output impedance: 50 ohms nominal
3.8.2.6.1 Connector: Type N
3.8.2.6.2 VSWR: ≤2:1 across the frequency range
3.8.2.7 Spurious outputs: ≤ -15 dBc for frequencies 9 kHz to 20 kHz
≤ -20 dBc for frequencies≥ 20 kHz

3.8.3 Reference Output
3.8.3.1 Frequency: 10 MHz
3.8.3.1.1 Accuracy: ±15 ppm or less after 1 hour warm-up
3.8.3.2 Amplitude: -10 dBm to +2 dBm
3.8.3.3 In/Out Connector: BNC female

4.0 GENERAL REQUIREMENTS

4.1 Power source MIL-PRF-28800F nominal power source requirements are invoked. Maximum power consumption: 250W

4.2 Battery restrictions Per MIL-PRF-28800F, lithium and mercury batteries are prohibited without prior authorization. A request for approval for the use of lithium or mercury batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.

4.3 Weight 20 kg (44 lb) nominal

4.4 Remote interface The equipment shall be provided with a remote interface in accordance with MIL-PRF-28800F. Two interfaces are required: an ANSI/IEEE-488 and either a serial or parallel interface. The ANSI/IEEE-488 interface shall provide for instrument control via a remote controller and for hardcopy output functions.The unit shall incorporate a serial or parallel interface for interconnecting to external devices, such as printers.

4.5 Data Storage: The equipment shall provide a storage mechanism for removable media data storage. The analyzer shall be able to store and recall from removable stage media at least one trace for display comparison with an active trace of the spectrum analyzer.

4.6 Calibration Interval The calibration interval shall be 12 months minimum in accordance with MIL-PRF-28880F.

4.7 Technical manual A technical manual shall be provided in both printed and electronic formats. The printed format shall be otherwise normally provided. The electronic format shall consist of the installation programs for the latest version of Adobe Acrobat for all computer platforms for which Acrobat is available and the technical manual in an electronic form that is readable through use of the Adobe Acrobat application.

4.8 Tutorials The equipment shall be provided with either on-line or multimedia CD tutorial. The tutoring should show the features and basic operation of the equipment, explain how to configure various tests and how to interpret results.

4.9 Year 2000 Compliance The manufacturer shall certify that the equipment is not susceptible to malfunction as a result of date/time functions associated with the calendar year 2000 or later.